IN THE CLAIMS

Please amend the claims as follows:

Claims 1-47 (Canceled).

Claim 48 (New): A method of assistance in starting a vehicle including a power unit and an automatic parking break equipped with a mechanism of executing a command to release or deactivate the automatic parking brake, comprising, at least after one starting phase of the power unit:

estimating a transmitted torque value that balances the vehicle on a slope;

executing in a loop an incremental calculation of an estimation of torque really transmitted at a given moment, while the estimation of the torque really transmitted is insufficient to surpass the estimation of the torque transmitted; then

producing a starting or deactivation command of the automatic parking brake.

Claim 49 (New): A method according to Claim 48, wherein the estimating of a transmitted torque value that balances the vehicle on the slope includes calculating a static model of the vehicle on the slope from a measurement of an angle of inclination delivered by a slope sensor and knowledge of a given value representative of the transmission speed.

Claim 50 (New): A method according to Claim 49, wherein when the measurement of an angle of inclination is less than a given threshold, the estimation of a transmitted torque value that balances the vehicle on the slope is increased by a given value.

Claim 51 (New): A method according to Claim 50, wherein the given value of increase of the estimation of a transmitted torque value that balances the vehicle on the slope depends on measurement of the angle of inclination.

Claim 52 (New): A method according to Claim 48, wherein the stage of incremental calculation comprises:

reading an effective average torque value (Cme) associated with a dynamic stage of the power unit;

reading of an engine speed value (Wm);

calculating time derivative of the engine speed;

determining moment of inertia of the power unit (Jmot) and calculating load moment in a form of a product of the moment of inertia of the power unit by the time derivative of the engine speed; and

determining an estimation of transmitted torque (ETT) according to an equation of the form: ECT = Cme – Jmot x dWm/dt.

Claim 53 (New): A method according to Claim 52, further comprising resynchronizing the reading of an effective average torque value and the reading of an engine speed value, so that each pair of values corresponds to a same time interval.

Claim 54 (New): A method according to Claim 53, further comprising adding a predetermined delay, preferably equal to three periods of passage to a Top Dead Center of a thermal engine of the power unit, on a value of resynchronization of the estimated average torque value, to take into account notably a waiting time for filling of a manifold and for ignition.

Claim 55 (New): A method according to Claim 53, wherein the resynchronization includes applying the resynchronization on derivative value (D_Wm) of the engine speed (Wm) between two samples separated by a resynchronization time notably according to equation: D_Wm = [Wm(8)-Wm(1)]/time, in which time determines the resynchronization period and Wm(1) and Wm(8) values of beginning and end of a resynchronization period.

Claim 56 (New): A method according to Claim 52, wherein the estimating a transmitted torque comprises:

comparing a transmitted torque estimation value to a predetermined threshold value;

if the predetermined threshold value is exceeded, testing an output value of a counter, incremented on each transmitted torque estimation stage relative to a predetermined threshold value,

if the predetermined threshold value is exceeded, producing a command authorizing release of the automatic parking brake.

Claim 57 (New): A method according to Claim 56, wherein the transmitted torque estimating further comprises executing a predetermined offset, so as to reduce disturbing effect of starting and/or stopping of some secondary consumers of energy or power supplied by the thermal engine, by carrying out the operation:

ECT_Corr_k = ECT_k + g(Consumers),

a prior determining a range in which the engine can be considered idling and a range during which an offset on the transmitted torque estimation can be executed.

Claim 58 (New): A method according to Claim 57, wherein the executing an offset is carried out following a test in a course of which four conditions are combined:

Wm < Smax_Wm_Idle,

ABS(D_Wm) < Smax_D_M_idle,

THETA_Acc < Smax_acc_idle,

D_Acc = = 0,

conditions under which:

Smax_Wm_idle represents a threshold value below which the engine speed indicates that the engine is at rest or idling;

Smax_D_M_idle represents a threshold value below which absolute value ABS(D_Wm) of the time derivative of the engine speed D_Wm indicates that the engine is at rest or idling;

Smax_acc_idle represents a threshold value below which degree of depression of the accelerator pedal THETA_Acc indicates that the engine is at rest or idling;

D_Acc represents time derivative of the degree of depression THETA_Acc of the accelerator pedal, which is negative when the driver lifts a foot from the accelerator pedal;

so that, if the test is negative, the control returns to initialization of a counter, the power unit being deemed unconnected to the driving wheels;

and so that, if the test is positive, the control passes to a test to look whether the counter is below a predetermined threshold value;

so that if the test is positive, an initially zero offset value, when the counter is itself initialized at the stage, is increased by the value of the current estimation;

then, the value of the counter being incremented by one step, and the control returning to the testing;

so that, if the test is negative, the offset value is transmitted to a routine of calculation of an offset value of the transmitted torque estimation, an offset value noted offset_ECT which is equal to the ratio of the offset value calculated on the value CPTR_threshold of the counter.

Claim 59 (New): A method according to claim 48, further comprising producing a driver activity report, so that release of the automatic parking brake will be refused in case of lifting of the accelerator pedal.

Claim 60 (New): A method according to claim 48, further comprising detecting a release demand when the power unit is not engaged.

Claim 61 (New): A method according to Claim 60, wherein the detecting includes, without using any sensor of depression of the clutch pedal, detecting the engaged state by two maps of the estimation of torque transmitted as a function of the degree of depression of the accelerator pedal respectively established when the wheels are engaged and when the wheels are disengaged, and comparing the value of the estimation of torque transmitted to each of the map values addressed by measurement of the degree of depression of the accelerator pedal to produce, if comparison to the first map is positive, a characteristic report of a disengaged state, and if the comparison to the second map is positive, to produce a characteristic report of an engaged state.

Claim 62 (New): A method according to Claim 60, wherein the detecting includes using a sensor of depression of an all-or-nothing clutch pedal to produce a characteristic report of an engaged or disengaged state.

Claim 63 (New): A method according to claim 48, further comprising detecting idling speed, including:

comparing the information on estimated engine torque (Cme) to two functions of estimation of idling speed in rotation with an estimation of positive transmitted torque fp() and in rotation with an estimation of negative transmitted torque fn();

applying to function fp() an idle gain applied on the estimated engine torque, an offset on the estimated engine torque value in idle position, and the estimated engine torque to produce a priori an idling speed value in rotation with an estimation of positive transmitted torque;

applying to function fn() an idle gain applied on the estimated engine torque, an offset on the estimated engine torque value in idle position, and the estimated engine torque to produce a priori an idling speed value in rotation with an estimation of negative transmitted torque;

comparing the engine speed value to determine whether a positive or negative idling speed is present, on rotation with an estimation of positive transmitted torque or with an estimation of negative transmitted torque;

authorizing release of the automatic parking brake only if no idling speed is detected.

Claim 64 (New): A method according to claim 48, further comprising saturation detection of the high-speed thermal engine, so that release of the automatic parking brake is prevented on saturation.

Claim 65 (New): A method according to claim 48, further comprising producing a horizontal starting operation without threshold on pressing the accelerator pedal, including:

producing a parking brake release command on sole determination that the transmitted torque estimation is higher than the predetermined threshold and, in particular, without testing a threshold on pressing the accelerator pedal;

initializing a starting state variable on starting up the vehicle, to indicate that the accelerator pedal has not yet been depressed, to 0;

reading a rest variable representative of the state of rest of the engine;

treating a stabilizing state variable so that it stays at 1 as soon as the accelerator has been pressed and until an idle variable returns to 1;

and then authorizing horizontal starting when the starting state variable equals 0 and testing that the transmitted torque estimation is higher than a threshold value to authorize release of the automatic parking brake and thus ensure starting of the vehicle keeping the vehicle in a certain range of acceleration.

Claim 66 (New): A method according to Claim 65, further comprising extending the horizontal starting operation to a descending starting operation in first gear.

Claim 67 (New): A method according to Claim 65, further comprising extending the horizontal starting operation to a descending starting operation in reverse gear.

Claim 68 (New): A method according to claim 48, further comprising an excess pitch detecting for preventing release of the automatic parking brake in a starting situation if the pitch of the vehicle exceeds a certain predetermined threshold.

Claim 69 (New): A method according to claim 48, further comprising determining a term of anticipation on the release command of the automatic parking brake dependent on

predetermined anticipation values, which includes, upon elaboration of the automatic parking brake release command, also executing measuring a degree of depression of the accelerator pedal, and then measuring a time derivative of the signal of the degree of depression, and comparing that instantaneous derivative value with a predetermined threshold, so that if the time derivation of variation of the degree of depression is greater than the predetermined threshold value, the incrementation loop of the transmitted torque estimation value is interrupted before the test is real, to produce in advance the automatic parking brake release command.

Claim 70 (New): A device to assist on-hill starting of a vehicle containing a power unit and an automatic parking brake comprising:

means for executing a parking brake release or deactivation command using the method according claim 48, a computer of a release command connected to a sensor of degree of slope on which the vehicle is engaged and to a sensor delivering information on speed or rate of rotation of the power unit of the vehicle, and wherein the computer contains means for estimation of the transmitted torque connected to a first input of a means of comparison, a second input of which is connected to means for producing a transmitted torque threshold value corresponding to maintenance of the vehicle, so that an output terminal of said means of comparison produces a release command addressed to the electric parking brake.

Claim 71 (New): A device according to Claim 70, further comprising:

a first reading module of effective average torque Cme supplied by the computer of the engine in a form of information circulating on a bus of the vehicle,

a second reading module of instantaneous speed Wm of rotation of a thermal engine supplied by the computer of the engine in a form of information circulating on the bus of the vehicle,

a third module making it possible to calculate time derivative dWm/dt of rate of rotation on output of the power unit from datum of rate of rotation or engine speed retrieved by the second module;

a fourth module for calculating a product of a value of moment of inertia Jmot characteristic of inertia of the engine, as well as the output value of said third module;

a fifth module for subtracting the output value of the fourth module, presented at a subtraction input of the fifth module, from the output value of the said first module, so that on its output an instantaneous value of the instantaneous estimation of transmitted torque produced is presented according to an equation: ECT = Cme – Jmot x dWm/dt.

Claim 72 (New): A device according to claim 70, wherein, the values of estimated engine torque and engine speed are supplied on fields of the bus by the computer controlling the engine, and further comprising a resynchronization circuit.

Claim 73 (New): A device according to Claim 72, wherein the resynchronization circuit includes:

a memory containing a table on a cycle of pairs of output data, so that a serial number of a value representing a first word received on its first input is associated with a serial number of a value representing a serial number of a second word received,

registers of sequences of successive values of the first word and/or of the second word and

means, dependent on associations of serial numbers of the memory, for applying on output a pair of a first word and a second word corresponding to a same moment of calculation and for presenting the pair of resynchronized words at output terminals.

Claim 74 (New): A device according to Claim 72, wherein the resynchronization circuit works essentially on the engine speed and makes it possible to use an offset in a mechanism making pairs of words available, a characteristic effect on acceleration of the thermal engine, and containing:

a synchronization register of the transmitted torque estimation;

a sequencer that receives a signal indicating a high dead center and that transmits writing commands and reading commands to the register;

a register of an available value of estimation of the synchronized transmitted torque;

a batch of registers in which there is maintained a plurality of successive values of the engine speed acquired at successive instants on the bus;

a differentiating circuit that contains:

a positive input connected to the reading output of a batch on which an oldest value of the engine speed Wm maintained in the batch is available;

a negative input to which a most recent value of the engine speed also available on the input terminal of the module is connected;

an input that receives a value representing time of a time elapsed on acquisition between the oldest value and the most recent value, so that, at the output of the differentiating circuit, a value representing a synchronized value of the average time derivative of the engine speed will be available according to an equation of form:

$D\_Wm_{sync} = [Wm(8)-Wm(1)]time;$

loaded in a register.

Claim 75 (New): A device according to Claim 74, wherein a writing command terminal of the register maintaining a synchronized value of the average time derivative of the engine speed is connected to the sequencer, which manages a register in which a time offset or delay value is registered, which corresponds to a desired delay in transmission of values synchronized with the rest of the estimator, so that one can take into account:

a time of filling of the manifold of the thermal engine, and

a time of ignition when the thermal engine is in acceleration phase, as is the case of on-hill starting.

Claim 76 (New): A device according to Claim 71, further comprising a counter that maintains a numeric value CPTR updated on each event presented at its input noted by increasing a count by a predetermined value;

an input on which is loaded value ECT_k, a value in a course of incrementation of the transmitted torque estimation and which is connected to an input of a circuit detecting arrival of a value ECT_k and to a first input of a comparator;

the detection output of the module for detection of arrival of a sample ECT_k is connected to the incrementation command input of the counter, the reading output terminal of which is connected to a first input of a comparator;

a register containing a threshold value and transmitted to a second input of the comparator;

the comparator contains a first output and a second output, complementing one another, so that if the test carried out by the comparator is positive, the first output passes to an active state and is connected to a first input of an AND gate, while the second output

passes to an inactive state and is connected to an input terminal for reset to an initial value of the counter;

a second comparator, a first input of which receives the counting value available in the counter and a second input of which is connected to a register maintaining a maximum counting value, at an end of which the release authorization can be executed;

so that, when the test carried out by the second comparator is positive, its output passes to the active state and is connected to a second input of the AND gate, so that the output of the AND gate passes to the active state to indicate an authorization of release of the automatic parking brake.

Claim 77 (New): A device according to Claim 76, further comprising a register containing a value determined as a function of a period of sampling or loop rate and of the time or delay desired between the first overshooting by the estimated transmitted torque value of the threshold value and execution of the release command of the parking brake, the register containing means for writing of the value, which is activated on initialization of the vehicle or else on its manufacture or on its maintenance by a production tool, or else on detection of one type of driver made by the vehicle's computer that transmits over the bus a characteristic value associated with the driver detected, by the ignition key or the type of driver according to an algorithm of the type of driving carried out by the driver.

Claim 78 (New): A device according to Claim 77, wherein, by an adder performing the operation: ECT_Corr_k = ECT_k + g(Consumers), the transmitted torque estimation value ECT received at the terminal further receives an offset predetermined to reduce a disturbing effect of starting and stopping by some secondary consumers of energy or power

supplied by the thermal engine, an offset carried out upstream from the circuit of detection and input of the comparator.

Claim 79 (New): A device according to Claim 70, further comprising a circuit for executing an offset according to the state of idling or load.

Claim 80 (New): A device according to Claim 70, further comprising a circuit for detecting activity of the driver by two comparators of a time derivative of the degree of depression of the accelerator pedal at an interval of degree of depression in two registers and by an AND gate to validate the automatic parking brake release command.

Claim 81 (New): A device according to Claim 70, further comprising a circuit for detecting an engaged or disengaged state of the power unit by a plurality of maps containing a series of transmitted torque estimation values dependent on the degree of depression of the accelerator pedal established according to whether the clutch is active or not, by an AND gate for validating production of the automatic parking brake release command depending on the type of driver, degree of depression of the accelerator pedal, and transmitted torque estimation, an AND gate validating the automatic parking brake release command.

Claim 82 (New): A device according to claim 70, further comprising detecting an idle state of the vehicle according to direction of rotation, which involves two generators of a function determining the idle engine speed, connected to two comparators of instantaneous value of the engine speed, and two AND gates for validating an automatic parking brake release command.

Claim 83 (New): A device according to claim 70, further comprising a circuit for determining a state of saturation of the thermal engine including a comparator for determining whether the engine speed and for applying or not a corrected value in a means of correction of estimated torque values.

Claim 84 (New): A device according to claim 70, further comprising a circuit for use in a horizontal starting operation, which comprises:

a circuit for activating the horizontal starting operation on configuration of the vehicle on production, maintenance, or on detection of a type of driver or of the driver when the driver sits down in the vehicle, which produces a logic signal at 0 if the operation is not implemented and at 1 if the operation is implemented;

a horizontal position detection circuit to detect that the signal representing the angle of inclination produced by the slope angle sensor is at absolute value less than a threshold value registered in a suitable register and representing the horizontal position limit;

a first AND gate to combine the output signals of the circuit for activating the horizontal starting operation and the horizontal position detection circuit;

a circuit for elaborating a starting state variable that comprises a comparator of the degree of depression of the accelerator pedal at a very low predetermined depression threshold and a reset circuit as soon as an idle variable coming from the rest of the starting device of the invention returns to 0;

a circuit to test the value of the transmitted torque estimation coming from the rest of the starting device at a threshold value and to produce a release command of the automatic parking brake;

a second AND gate for combining the horizontal release command coming from the circuit to test the value of the transmitted torque estimation at the output for the first AND

gate and the output of which is connected to the electric motor controller of the automatic parking brake.

Claim 85 (New): A device according to claim 70, further comprising a circuit for use of a starting operation on descent in first gear, which includes:

a circuit for activating a starting operation on descent in first gear, upon configuration of the vehicle on production, maintenance, or upon detection of a type of driver or of the driver when the driver sits down in the vehicle, which produces a logic signal at 0 if the operation is not implemented and at 1 if the operation is implemented;

a circuit for detection of descent in first gear, to detect that the signal representing the angle of inclination produced by the angle of slope sensor is greater than a positive threshold value registered in a suitable register and representing the limit of descent in first gear;

a third AND gate for combining the output signals of the circuit for activating the starting operation on descent in first gear and of the circuit for detection of descent in first gear;

a fourth AND gate for combining the output of the third AND gate and the output of the circuit for testing the value of the transmitted torque estimation coming from the rest of the starting device of the invention at a threshold value and for producing a release command of the automatic parking brake on descent in first gear.

Claim 86 (New): A device according to claim 70, further comprising a circuit for use of a starting operation on descent in reverse, which comprises:

a circuit for activating a starting operation on descent in reverse gear, upon configuration of the vehicle on production, maintenance, or upon detection of a type of driver

or of the driver when the driver sits down in the vehicle, which produces a logic signal at 0 if the operation is not implemented and at 1 if the operation is implemented;

a circuit for detection of descent in reverse gear, to detect that the signal representing the angle of inclination produced by the angle of slope sensor is greater than a positive threshold value registered in a suitable register and representing the limit of descent in reverse gear;

a third AND gate for combining the output signals of the circuit for activating the starting operation on descent in reverse gear and of the circuit for detection of descent in reverse gear;

a fourth AND gate for combining the output of the third AND gate and the output of the circuit for testing the value of the transmitted torque estimation coming from the rest of the starting device of the invention at a threshold value and for producing a release command of the automatic parking brake on descent in reverse gear.

Claim 87 (New): A device according to claim 70, further comprising a circuit for detecting excess pitch, an output of which is active if the excess pitch exceeds a threshold predetermined in a register, the output of the circuit for detecting excess pitch being combined by a reversing input of an AND gate, another input of which is connected to the output of the device, on which is located the release command of the automatic parking brake, and the output of the AND gate producing the release command of the automatic parking brake outside of excess pitch.

Claim 88 (New): A device according to Claim 87, wherein the circuit for detecting excess pitch contains an input terminal that receives a signal produced by the angle of slope sensor, which presents sufficient resolution for detecting excess pitch, transmitted to the input

of a circuit for producing a signal representing the time derivative of the angle of inclination detection signal, an output of which is connected to an input of a comparator, an other input of which is connected to a register maintaining an excess pitch threshold value, wherein an output of the comparator is active when the derivative of the signal representing the angle of inclination of the sensor is greater than the predetermined threshold.

Claim 89 (New): A device according to Claim 88, further comprising a generator of excess pitch threshold values as a function of the angle of inclination produced by the sensor to produce the excess pitch threshold value.

Claim 90 (New): A device according to Claim 89, wherein the generator of excess pitch threshold values contains a first series of threshold values in a first starting direction and a second series of threshold values in a second starting direction.

Claim 91 (New): A device according to claim 70, further comprising a circuit for producing an operation of anticipation of the dynamics of starting, which comprises a circuit for calculating the time derivative of the signal of the degree of depression supplied by the angle of slope sensor connected to a first input of a comparator, the other input of which is connected to a generator of a predetermined threshold value, so that its output is active if the predetermined threshold value is exceeded, wherein the output signal of the comparator is then transmitted to a first input of another AND gate, the second input of which is connected to a circuit for detecting that the transmitted torque estimation is in the process of incrementation, by detecting evolution of the counter CPTR, and the output of the other AND gate is then used as anticipated release command of the automatic parking brake.

Claim 92 (New): A device according to Claim 91, further comprising a generator of a predetermined threshold in a form of a table of threshold values addressed by the value of the degree of slope measured by the angle of slope sensor, the predetermined threshold value then being transmitted to the aforementioned comparator.

Claim 93 (New): A device according to claim 70, further comprising a circuit for taking into account response time of the automatic parking brake and dynamism of the driver with an anticipation or prediction (ECT_predicted) n on the transmitted torque estimation (ECT), which involves:

a prediction operator for executing an operation of the form: ECT_predicted(Tr) = ECT + Tr x (d/dt)·ECT, in which Tr is a characteristic value of response time of the electromechanical system and the time derivative ((d/dt·ECT) on the transmitted torque estimation is an estimation of the driver's dynamism;

a prediction test operator on the transmitted torque estimation to at least one release test threshold with predetermined anticipation, registered, and/or calibratable in a memory, so that an anticipated release command of the automatic parking brake is produced if the test operator is activated.

Claim 94 (New): A device according to claim 70, further comprising a processor with a logic architecture in four blocks:

an acquisition block of input data, among which are the engine speed, the speed of the vehicle, the angle of slope, estimated average torque, and degree of depression of the accelerator pedal, notably sampled on the bus;

a signal treatment block applied to input data, carrying out digital filtering of all or part of the input data and making scale or unit corrections;

a block for initialization of parameters of the method, involving threshold values and initializations of the counters;

a block for execution of a method to generate a release command of the automatic parking brake.